Safety Instructions

Used symbols

Always observe this information to prevent damage to the device

Important Comments

Before starting with installation of the MS 10B Alarm Unit, we recommend you to read the important information beneath.

Qualification

The installation of the product detailed in this manual, can only be installed by a certified installation company. Otherwise the warranty becomes void.

Caution:

Before starting with installing the MS 10B Alarm Unit, check if all parts are present.

Package includes:

- MS 10B
- Installation/User Manual MS 10 B
- Mounting Clips (2x)
- Inspection Sheet

MARBLE Full Control!
MS 10B ALARM UNIT

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1. Installation Manual

1.1 Mechanical Installation

The MS 10B unit is specially designed for mounting in a switchboard or desk.
The unit can be mounted in the panel or desk with two mounting clips which are included. Beneath you will find the dimensions needed to mount the MS 10B unit.

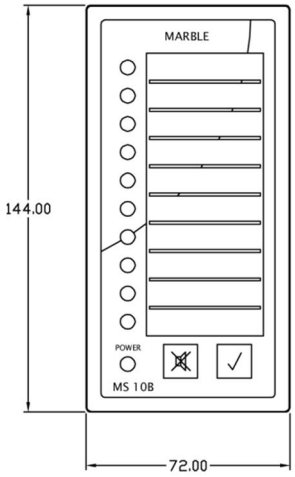


Figure 1. Front view MS 10B

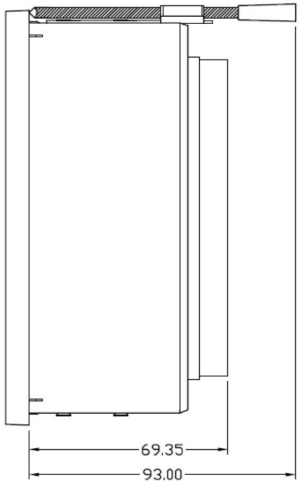


Figure 2. Side view MS 10B

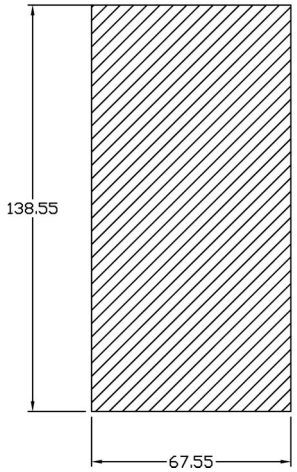


Figure 3. Panel cut out MS 10B

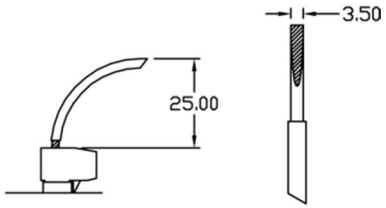
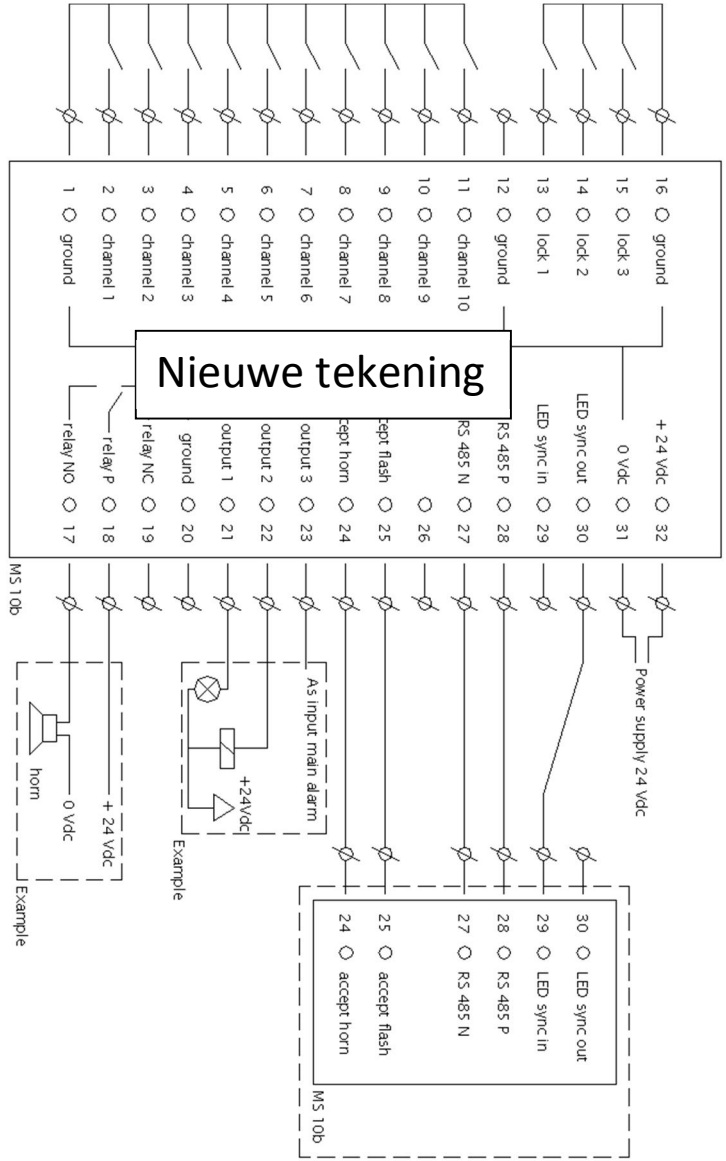


Figure 4. Wiring space MS 10B

1.2 Electrical Installation

Figure 5. Wiring diagram



1.2.1 Power Supply

Description	Specification
Supply voltage	18-30 Vdc
Power consumption	2,7 Watt
Digital inputs	10 (N.C./N.O.)
Digital lock inputs	3 (N.C./N.O.)
Group outputs	3 (N.E/N.N.E) 500mA
Relay output	1 (N.O.)

Table 1. Power supply specifications

1.2.2 Used cable

Recommended is a shielded twisted cable (LIYCY). Connect shield at one end only. The end of the shield must be insulated with tape or insulating tube.

1.2.3 Electrical installation Roadmap

1. Pull the connectors from the unit.
2. Connect the wires to the connectors.
3. Turn the breaker of the supply on.
4. Check voltage polarity of the power supply.
5. Turn breaker off.
6. Plug the connectors to the unit.
7. Turn breaker on.
8. Check if the unit is working, the green LED will Flash.
9. Test channels and output wiring. The software is in default setting.
10. When the MS 10B unit operates , configuring can be started.

1.2.3 Inputs

The unit has 10 inputs (channels). The inputs are connected to the terminals 2 – 11. Terminal 1 is the common ground, which should always be used.

Inputs can be configured as an Alarm input or as a Status input. Both input types can be configured as Normally Open (N.O.) or as Normally Closed (N.C.) input.

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1.2.4 Outputs

The unit has 3 outputs 24V DC, which can deliver an maximum of 500 mA each. These outputs are available at the terminals 20-23. Terminal 20 is the common ground for the outputs. Make sure the common ground will be used.

The three group outputs can be configured in three different ways:

- Level
- Dip
- LED-copy

1.2.5 Data communication

The MS 10B is equipped with an RS485 communication port. Using this port it is possible to link two or more units. The one is set as ‘master’ and the other ones as ‘slave’. The master unit has the channels connected. The slave unit will follow the master-unit as a second display.

The cancel horn/accept flash buttons work remotely on all units. When local cancel horn an accept flash functionality is preferred, ‘slave 4’ mode should be set.

It is also possible to connect a PLC as master and the MS 10B as slave. This gives the possibility to create networks with a PLC system as a main Alarm system and the MS 10B as sub-systems.

Description	Specification
Communication Interface	RS-485
Protocol	Modbus-RTU
Baudrate	19200
Databits	8
Parity	None
Stopbits	8
Slave-ID	1 - 100
Modbus functions	3 & 6

Table 2. Data communication specifications

Bit	Function	Bit	Function
B0	N.U.	B8	I8
B1	I1	B9	I9
B2	I2	B10	I10
B3	I3	B11	A.H.
B4	I4	B12	A.F.
B5	I5	B13	N.U.
B6	I6	B14	N.U.
B7	I7	B15	N.U.

Table 3. Bit functions

B0-B15 : Bit 0 t/m Bit 15
I0-I15 : Input 1 t/m Input 15
N.U. : Not Used
A.H. : Accept Horn
A.F. : Accept Flash

1.3 Configuring of the MS 10B unit

The first step of configuring is connecting the power supply. The MS 10B parameters are configured by four rotary knobs and a save button.

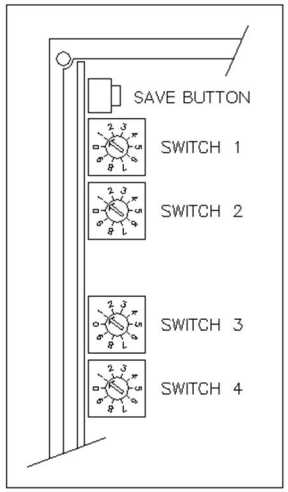


Figure 6. Inside MS 10B

These switches are on the PCB behind the removable front. To open the MS 10B, remove the black frame at the front.

It is permitted to disconnect the front from the PCB during configuring!

The 10 alarm channels and status channels are default set as a N.C. (normally closed) alarm input with one second delay time.

1.3.1 Roadmap of configuring MS 10B unit

For programming the MS 10B, the steps on the following page have to be performed.

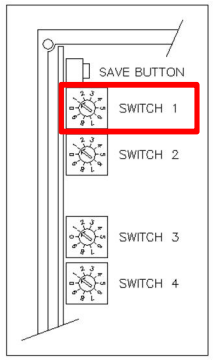
To start configuring, the power supply has to be connected!

Step 1: Function Selection

Switch 1 configures the function on the PCB. There are 10 different functions available, which are described in the Configuration Table (page 13).

The Configuration Table is also displayed on the side of the MS 10B unit.

If Switch 1 is in the normal operation mode (position 1), the power LED will flash. During configuring the power LED will light steady.



After configuring, switch 1 has to be set to position 1, otherwise the MS 10B unit will not work!

Step 2: Input / Output Selection

Switch 2 will select the input or output selected with switch 1.

If function 9 is chosen in step 1, switch 2 can only be used for the master or slave selection.

Step 3: Input / Output parameters

Switches 3 and 4 are used to configure settings of the function chosen with switch These will work in combination with the input or output chosen with switch 2.

Table 4. Roadmap of configuring MS 10B unit

Continuation of Roadmap MS 10B unit

Step 4: Save settings

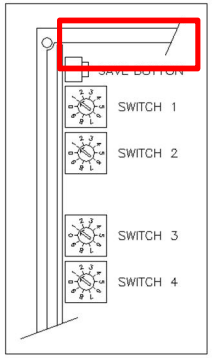
The settings chosen with switch 1, 2 and 3 will be saved by pressing the save button.

You will find the save button above the four selector switches.

The settings will be saved in the retain memory of the MS 10B.

Repeat this step after each setup!

After the settings are saved, LED 1 to 10 will reflect the settings 3 and 4.



The setting of switch 3 is reflected by a slow flashing LED, the setting of switch 4 is shown by a fast flashing LED. If the settings of switches 3 and 4 have the same setting, the LED will light steady**.**

After configuring, switch 1 has to be set to position 1, otherwise the MS 10B will not work!

Table 5. Continuation of table 4

1.3.2 Examples of configuring inputs

1.3.2.1 N.O. Alarm input

If an input is configured as a N.O. alarm input, then after closing the contact, the corresponding LED will flash and the potentially free output will close.

1.3.2.2 N.C. Alarm Input

If an input is configured as a N.C. alarm input, then after opening the contact, the corresponding LED will flash and the potentially free output contact will close.

Example 1: Channel 3 has to be configured as a N.C. alarm input	
1	Remove the front frame and the front of the unit
2	Set switch 1 at position 2
3	Set switch 2 at position 3
4	Set switch 3 at position 1
5	Set switch 4 at position 1
6	Push the save button to save the settings
7	Set switch 1 back at position 1
8	Place the front and the front frame

Table 6. Configuring N.C. alarm input

1.3.2.3 N.O. Status input

If an input is configured as a NO status report, the corresponding LED will only display the status of the input. The LED will light if the input is high.

Example 2: Channel 7 has to be configured as a N.O. status input	
1	Remove the front frame and the front of the unit
2	Set switch 1 at position 2
2	Set switch 2 at position 7
3	Set switch 3 at position 2
4	Set switch 4 at position 2
5	Push the save button to save the settings
6	Set switch 1 back at position 1
7	Place the front and the front frame

Table 7. Configuring N.O. status input

1.3.2.4 N.C. Status input

If an input is configured as a NC status report, the corresponding LED will only display the status of the input. The LED will light if the input is low.

1.3.3 Example of configuring an oil pressure alarm

As an example we will configure the “oil pressure low” alarm of a diesel engine. The oil pressure contact on the engine is N.C. (Normally Closed). The alarm has to occur when the pressure drops, the switch will then open. We want to configure this alarm on channel 5 as “oil pressure low”.

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To prevent false alarms, the channel is given a delay of 5 seconds. If the engine stops, the oil pressure will drop. This will generate an alarm. To prevent this, we are going to use the running signal contact of the diesel engine as a lock. To prevent a false alarm when the engine is started, the Lock is given an off delay of 9 seconds.
To configure the delay, use the following configuration settings in the table beneath.

Subject	Switch	position
Delay	1	3
Channel input	2	5
Delay	3	0
Delay-time (5 seconds)	4	5
Press the save-button		

Table 8. Configuring the delay

After saving LED 10 (for 0) will flash slowly and LED 5 will flash fast. This reflects the 5 seconds delay setting.

The following step is to configure the Lock.

Subject	Switch	position
Lock	1	5
Channel input	2	5
Running signal	3	4
Not used	4	0
Press the save button		

Table 9. Configuring the lock

After the setting is saved, LED 4 will flash slowly and LED 10 flashes fast.

Now we have to configure the settings of the lock.

Subject	Switch	position
Lock-settings	1	6
Lock selection	2	3
Lock configuration setting	3	6
Seconds	4	9
Press the save button		

Table 10. Configuring lock settings

> ⚠ ***After configuring, switch one has to be set to position 1, otherwise the unit will not work.***

1.3.4 Example of using a unit as a display

Example 8: Unit 2 has to be used as a display of unit 1	
1	Remove the front frame and the front of unit 1
2	Set switch 1 at position 9
3	Set switch 2 at position 1
4	Push the save button to save the settings
5	Set switch 1 back at position 1
6	Replace the front and the front frame of unit 1.
7	Unit 1 is now ready to be used as Master.
8	Remove the front frame and the front of unit 2
9	Set switch 1 at position 9
10	Set switch 2 at position 2
11	Set switch 3 at position 0
12	Set switch 4 at position 0
13	Push the save button to save the settings
14	Set switch 1 back at position 1
15	Replace the front and the front frame of unit 2.
16	Unit 2 is now ready to be used as slave.

Table 11. Example of display use

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1.3.5 Delays

It is possible to configure delays on the inputs or outputs of the MS 10B. The delay prevents false alarms generated by fast reaction times of a sensor or when automatic recovery must take place.

Example 3: Channel 5 has to be delayed for 5 seconds	
1	Remove the front frame and the front
2	Set switch 1 at position 3
3	Set switch 2 at position 5
4	Set switch 3 at position 5
5	Push the save button to save the settings
6	Set switch 1 back at position 1
7	Replace the front and the front frame

Table 12. Delay channel 5

1.3.5 Locks

A lock is used to block any alarm or status report, when it is not necessary to display the alarm or status. This is usually the case with alarms on engines. These alarms are blocked when the engine is at standstill. The locks are free configurable for each channel and can be set with an “on” or “off” delay. The units has 3 lock-inputs. The locks can be connected to the *terminals 13-15*. Terminal 16 is the ‘common ground’. Which should always be used.

> ⚠ ***These connections are only needed if the option ‘Lock by lock input’ will be used.***

1.3.7 Configuration Table

Switch 1 Function	Switch 2 Channel	Switch 3 Setting	Switch 4 setting
1. Alarm mode	Not Used	Not used	Not used
2. Input mode	1 - 10	1. N.C. 2. N.O.	1. Alarm 2. Status
3. Input delay	1 - 10	0 - 99 sec.	
4. Lock by channel	1 - 10	1st Lock CH. 1 - 9 10 - No lock	2nd. Lock CH. 1-9 10. No lock
5. Lock inputs & Group outputs	1 - 10	1. Lock 1 2. Lock 2 3. Lock 1, 2 4. Lock 3 5. Lock 1,3 6. Lock 2,3 7. Lock 1, 2 and 3 10. No locks	1. Lock 1 2. Lock 2 3. Lock 1, 2 4. Lock 3 5. Lock 1,3 6. Lock 2,3 7. Lock 1, 2 and 3 10. No output
6. Lock settings	1 - 3	1. N.C. Direct 2. N.O. Direct 3. N.C. Delay on 4. N.O. Delay on 5. N.C. Delay off 6. N.O. Delay off	Lock delay 1-10 Seconds
7. Output settings	1 - 3	1. Level 2. Dip 3. Led copy	1. N.N.E. 2. N.E.
8. Output delays	1 - 3	On delay 1-10 Seconds	Off Delay 1-10 Seconds
9. Communication	1. Master 2. Slave 3. Slave WB 10. None	* Slave setting 1-99 Slave ID 00 - Follow master MS 10B	* Slave setting
10. Set default & Relay settings	1. Default 2. Relay	1. Level 2. Dip	1. N.N.E. 2. N.E.

Abbreviations:

N.C. : Normally Closed N.N.E. : Normally Not Energized
N.O. : Normally Opened N.E. : Normally Energized
W.B. : Without Buttons Accept horn/Accept flash

Table 13. Configuration table

2. User manual

2.1 Introduction

The MS10B of Marble Automation is a flexible system that handles alarm /status reports.
By using a micro controller in combination with configure switches, the parameters can simply be modified on site by the user without the need for a PC with configure facility. Also the use of SMD technology instead of conventional components makes the MS10B very compact. It is possible to join several MS10B units to each other and let them interface with each other. The MS10B can be used in shipping as well as industrial applications.
The MS10B has been type approved by Lloyds Register (07/30018) and Bureau Veritas (21072/A0).

2.2 General

The MS10B has ten channels which can be used either as an alarm input or status input. These channels are galvanic isolated from the internal feeding part by optocouplers. The internal circuit is separated from the 24V net with a DC/DC converter. The three lock inputs of the MS 10B unit can be linked to the alarm inputs, which makes it possible to block the alarms.
The MS10B unit is equipped with an RS-485 communication port which can be used to interface with other systems or MS10B units.
The MS10B unit has one potential free relay contact that can be used to control a horn or rotating light. There are three transistor outputs which can be linked to the alarm inputs. They can be used to relay the main alarm system or to generate switching commands.
When using multiple MS10B units next to each other it is possible to synchronize the LED-lights so they will flash simultaneously.

2.3 Operating

2.3.1 Accepting alarms

To cancel the horns, press the ‘cancel Horn’ button. After that the ‘accept’ button can be pressed. This will cause the Led to light steady or turn off if the alarm has recovered.

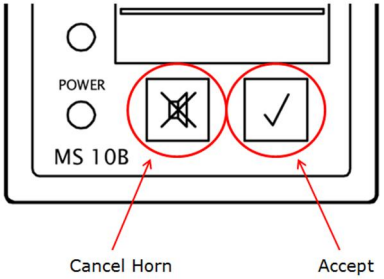

Figure 7. Cancel horn and accept

2.3.2 Dimming

The backlight of the MS 10B can be dimmed by pressing the ‘Cancel Horn’ button and holding it until the desired light setting is reached. The power LED can be dimmed by holding the ‘Accept’ button.

2.3.3 LED-test

The LED lights can be tested by pressing the ‘Cancel Horn’ and ‘Accept’ buttons at the same time. All LED lights should light up.

2.3.4 Alarms

When an input is configured as alarm input and the alarm contact opens or is closed depending on N.O./N.C. setting, the corresponding LED will flash and the potential free contact will close. An alarm is generated after exceeding the alarm delay time.
This delay prevents false alarms generated by contact rumble. The delay has a range of 1 - 99 seconds. If there is an alarm active the horn can be turned off by pressing the ‘Cancel Horn' button. The channel LED will continue to flash and can be stopped by pressing the `Accept' button. It is possible to configure incident, so that it switches off for half a second and then switches on again, if there is an alarm active and the horn has not yet been cancelled.

2.3.5 Status reports

If an input is configured as a status report, this channel will only display the status of the input. The LED will light if the input is high or low, depending on the N.O./N.C. settings. When set as status report the potential free relay contact will not operate.

2.3.6 LED synchronizing

The LED synchronizing can be applied if more than one MS 10B units are being used, placed next to each other. If the Led synchronizing inputs en outputs are connected to each other than the power and alarm LED’s will flash simultaneously.

2.3.7 Cancel horn and accept flash (external)

If more MS 10B units are placed next to each other, cancel horn and accept flash buttons can be joined by connecting the corresponding terminals. Each button that is pressed, will work for every unit.

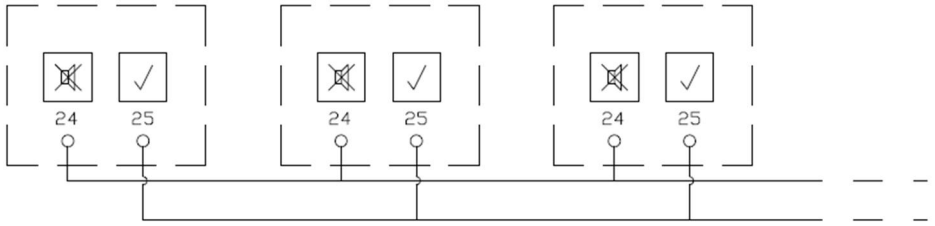

Figure 8. Connected MS 10B units

2.3 Maintenance

The MS 10B unit is maintenance free. It is permitted to clean the front of the MS 10B unit with a damp cloth.

Do not use aggressive cleaning agents!

2.4 Troubleshooting

Symptom	Possible cause	Test and remedies
Green LED is not flashing	Power supply is not connected	Check if power supply is connected
Green light gives a steady light	Error in processor	Turn of the power supply for a few seconds and connect again
	Processor is broken	Contact Marble Automation for possible solution
Alarm is not coming in	Broken sensor	Check sensors/repair/replace sensors
	Electrical installation is broken	Check electrical installation/ otherwise repair the installation
	Unit is set as ‘slave’ and not as ‘Master slave’.	Reconfigure the unit as ‘Master slave’.
Relay switches off when an alarm is coming in	Input is configured as N.C. (Normally Closed)	Reconfigure input as N.O. (Normally Open)

Table 14. Table troubleshooting

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